

Work Order ID 81522

May-28-12 8:07:16 AM

81522

Page 1

Item ID: D350-748-201

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Installation, High Aft

Start Date: 15/03/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 04/04/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: MLS

Date: 12/05/28

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

Draw Nbr

Revision Nbr

D350-748-241

F

100

0.00

100

DOCUMENT CONTROL

54

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-201

CHG002

DAS 16 12/10/26

4/4/12 MLS 12-10-26

110

0.00

110

BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT

MO/ 12-10-01

120

0.00

120

QC Crosstube Dimensional Check

QC

Memo

0.00

Quality Control

QC 6

DAS 16 12/10/26

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
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NOTE: Date & initial all entries

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Stop ***NR2***

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|---|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 125 | | 0.00 | | | | | | | |
| *125* | | | | | | | | | |
| HandFXtube | Memo | 0.00 | | | | | | | |
| Hand Finishing Crosstubes | ***Stress relief*** Heat treat crosstube as per QSI010 4.3 Temp: _____ Start time: _____ Finish time: _____ | | | | | | | | |
| 126 | Receive & Inspect | | | | | | | | |
| 127 | QC5- Inspect part completeness to step on W/O | 0.00 | | | | | | | |
| *127* | | | | | | | | | |
| QC | Memo | 0.00 | | | | | | | |
| Quality Control | | | | | | | | | |

CL 12/10/02 ①

12/10/03 ①

7/10: 18026
metan

DAS 16 17/10/09

1554e PO # 18250

accurate

LPI per ASTM 1417
Level 2

RI 12-10-25

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
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Run Start

NR1

Approvals:

Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Stop

NR2

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

0.00

130

Crosstubes

0.00

Crosstubes

Memo

1-Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-241

4-Remove all marks from tube within limits of D350-748-241

5- Apply a light coat of LPS3 on the interior of tube

Batch: 448

140

QC6- Inspect dimensions to drawing

0.00

140

QC

Memo

0.00

Quality Control



Handwritten signature



Handwritten notes: 12-10-10, 12-10-10, and other markings.

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|---|----------------------|---------|--------|--------------|---------------|---------------|------------------|------------------------------|
| 150 | Outsource process-Cadplate per QSI017 4.1.9.1 | 0.00 | | | | | | | |
| *150* | | | | | | | | | |
| Outsource3 | Memo | 0.00 | | | | | | | |
| Outsource process - Cad plate | Issue P/O: <u>18101</u> Stress relief at 375° for 5 hours Magnetic Particle Inspect per ASTM E1444 Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2 Embrittle relief at 375° for 8 hours, Chromate Treat Possible Supplier: Southwest United Industries Ensure Certificate of Conformity is attached | | | | | | | | <u>CEL 12/10/11</u> <u>①</u> |
| 160 | Receive & Inspect for Damage & Mat'l Certs | 0.00 | | | | | | | |
| *160* | | | | | | | | | |
| Packaging | Memo | 0.00 | | | | | | | |
| Packaging | Ensure certificate of conformity is attached | | | | | | | | <u>12/14/25</u> <u>①</u> |
| 170 | QC5- Inspect part completeness to step on W/O | 0.00 | | | | | | | |
| *170* | | | | | | | | | |
| QC | Memo | 0.00 | | | | | | | |
| Quality Control | | | | | | | | | |



12/10/25

| W/O: | | WORK ORDER CHANGES | | | | | |
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Item ID: D350-748-201

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Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Installation, High Aft

Start Date: 15/03/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 04/04/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***
Stop ***NR2***

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|---|------------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 180 | SprayPaint | 0.00 | | | | | | | |
| *180* | | | | | | | | | |
| SprayPaint | Memo | 0.00 | | | | | | | |
| Spray Painting | 1-Prime inside crosstube as per QSI 005 4.2 | 122888 S: 10:00-F10:20 | | | | | | | |
| | 2-Paint Outside of Tube as per Dart QSI 005 4.2 | 122381 S: 9:20-F2:45 | | | | | | | |
| 190 | QC14- Inspect Spray Paint | 0.00 | | | | | | | |
| *190* | | | | | | | | | |
| QC | Memo | 0.00 | | | | | | | |
| Quality Control | Then, Wrap in plastic bag to protect from scratches | | | | | | | | |
| 200 | Crosstubes | 0.00 | | | | | | | |
| *200* | | | | | | | | | |
| Crosstubes | Memo | 0.00 | | | | | | | |
| Crosstubes | 1-Install Ground wire Insert, then insert screw and washer | | | | | | | | |
| | 2-Install Abrasion strips as per Dwg D350-748-241 & QSI 035. | | | | | | | | |
| | 3-Install supports Using Dt8876 as per Dwg D350-748-241, Torque to 60-80 IN-LBS | | | | | | | | |

| W/O: | | WORK ORDER CHANGES | | | | | |
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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

81522

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N900040100

Setup Start *NS1*

Stop *NS2*

Start Date: 15/03/2012 **Start Qty:** 1.00

1

Cust Item ID:

Required Date: 04/04/2012 **Req'd Qty:** 1.00

1

Customer:

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

**Insp.
Stamp**

QC5- Inspect part completeness to step on W/O

0.00

210

0.00

QC

Memo

Quality Control

Pick Kit

0.00

220

0.00

Packaging

Memo

Packaging

QC4- 100% Inspect kits for completeness

0.00

230

0.00

QC

Memo

Quality Control

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
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NOTE: Date & initial all entries

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Item ID: D350-748-201

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N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Installation, High Aft

Start Date: 15/03/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 04/04/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start ***NR1***

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop ***NR2***

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|---|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 240 | Packaging | 0.00 | | | | | | | |
| *240* | | | | | | | | | |
| Packaging | Memo | 0.00 | | | | | | | |
| Packaging | Identify and pack for shipping as per PPPD350-748-201 | | | | | | | | |
| | Location: _____ | | | | | | | | |
| | PPP Rev: _____ | | | | | | | | |
| 250 | QC21- Final Inspection - Work Order Release | 0.00 | | | | | | | |
| *250* | | | | | | | | | |
| QC | Memo | 0.00 | | | | | | | |
| Quality Control | | | | | | | | | |

01/10/2012

12/10/31

12-10-26

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
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NOTE: Date & initial all entries

Picklist Print

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Work Order ID: 81522

81522

Parent Item: D350-748-201

D350-748-201

Parent Item Name: Crosstube Installation, High Aft

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev: A New Issue 06-07-05 JLM
 IPP Rev: B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD
 IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC
 IPP Rev: E 08.12.11 Step17 was step 21 KJ Verified by:EC IPP Rev:F
 10.08.04 added QSI010 4.3 DD verf:EC

| Component Item ID/ Item Name | Replacement Item ID | Mfg/ Purch | Bin Item | Primary Location | Last Location | Route Seq ID | Unit of Measure | Qty on Hand | Qty per Kit | Total Qty | Qty Issued | Date Issued | Status |
|---------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|
| D350-748-241TRN | | Manufactured | No | | | 110 | Each | 2.0000 | 1 | 1 | | | |

D350-748-241TRN

Crosstube Turning Detail

| Location | Loc Qty | Loc Code |
|----------|---------|----------|
| LG | 2 | |
| 61314 | 0 | |
| 61315 | 0 | |
| 79393 | 1 | |
| 83287 | 1 | |

ALS4-1032-225

Purchased

No

200

Each

855.0000

1

1

ALS4-1032-225

Insert

122290

**

| Location | Loc Qty | Loc Code |
|----------|---------|----------|
| ST281 | 832 | |
| 108696 | 146 | |
| 110768 | 62 | |
| 118386 | 55 | |
| 118966 | 68 | |
| 121269 | 501 | |
| ST282 | 23 | |
| 120410 | 10 | |
| 120451 | 13 | |

AN960JD10

NAS1149D0363J Purchased

No

200

Each

0.0000

1

1

AN960JD10

Washer

123248

**

① MO 12-10-01

① AP 12-10-26

① AP 12-10-26

| W/O: | | WORK ORDER CHANGES | | | | | |
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Parent Item: D350-748-201

D350-748-201

Parent Item Name: Crosstube Installation, High Aft

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

D2856-400

Manufactured No

200 f

254.5445 1.181 1.243158

D2856-400

Abrasion Strip

**

AP 12-10-26

86905

| <u>Location</u> | <u>Loc Qty</u> | <u>Loc Code</u> |
|-----------------|----------------|-----------------|
| ST403 | 216 | |
| 81875 | 216 | |
| ST409 | 38.5445 | |
| 63735 | 0.6696 | |
| 68076 | 0.3149 | |
| 71164 | 8.46 | |
| 79551 | 29.1 | |

I- cut as per dwg D2856

D3502-1

Manufactured No

200 Each

21.0000 2 2

D3502-1

Support

**

AP 12-10-26

77041

| <u>Location</u> | <u>Loc Qty</u> | <u>Loc Code</u> |
|-----------------|----------------|-----------------|
| ST051 | 21 | |
| 73419 | 11 | |
| 74873 | 10 | |

MS21920-20

Purchased No

200 Each

86.0000 2 2

MS21920-20

Clamp (per MIL-DTL-8783C)

**

AP 12-10-26

122254

| <u>Location</u> | <u>Loc Qty</u> | <u>Loc Code</u> |
|-----------------|----------------|-----------------|
| LG050 | 86 | |
| 116799 | 8 | |
| 120676 | 8 | |
| 121067 | 20 | |
| 121274 | 50 | |

| W/O: | | WORK ORDER CHANGES | | | | | |
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D350-748-201

Parent Item Name: Crosstube Installation, High Aft

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

MS27039-1-10

Purchased

No

200

Each

126.0000

1

1

MS27039-1-10

Screw

**

AP 12-10-26

Location

Loc Qty

Loc Code

GA

100

120449

100

ST291

26

120120

26

AN4-41A

Purchased

No

220

Each

539.0000

8

8

AN4-41A

Bolt

**

SP

Location

Loc Qty

Loc Code

360

181

121185

181

ST360

358

115108

3

115705

7

118451

29

118838

50

119328

100

120423

150

121205

15

121573

4

AN4-6A

Purchased

No

220

Each

1,515.0000

16

16

AN4-6A

Bolt

**

M122808

SP121026

Location

Loc Qty

Loc Code

355

223

121631

223

ST356

1292

119017

792

121243

500

SMB

May-28-12 8:07:22 AM

Shop Packet Print

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| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
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| | | | | | | | | |

NOTE: Date & initial all entries

Picklist Print

May-28-12 8:07:22 AM

Page 4

Work Order ID: 81522

81522

Parent Item: D350-748-201

D350-748-201

Parent Item Name: Crosstube Installation, High Aft

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

AN5-32A Purchased No

220

Each

245.0000

4

4

AN5-32A

Bolt

**

SP

Location

Loc Qty

Loc Code

ST339

145

119862

50

120423

75

120910

20

ST340

100

121541

100

AN960JD416 NAS1149D0463J Purchased No

220

Each

30.0000

32

32

AN960JD416

Washer

**

m123248 SP.

Location

Loc Qty

Loc Code

ST351

30

116289

10

119097

20

AN960JD516 NAS1149D0563J Purchased No

220

Each

0.0000

8

8

AN960JD516

Washer

**

m121255 SP

12-10-26

SP

May-28-12 8:07:23 AM

Shop Packet Print

Page 4

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
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NOTE: Date & initial all entries

Picklist Print

May-28-12 8:07:23 AM

Page 5

Work Order ID: 81522

Parent Item: D350-748-201

Parent Item Name: Crosstube Installation, High Aft

81522

D350-748-201

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

D3500-1

Manufactured No

220

Each

75.0000

4

4

D3500-1

Saddle

**

B90734 SP

Location

Loc Qty

Loc Code

ST423

14

78595

14

ST424

31

73405

20

73406

8

76000

3

ST425

30

76940

30

SMB

D3501-1

Manufactured No

220

Each

367.0000

16

16

D3501-1

Bushing

**

SP

Location

Loc Qty

Loc Code

ST051

367

67757

4

73391

6

74866

207

77033

61

81955

26

83253

63

16x

SMB

MS21042L4

Purchased

No

220

Each

4,276.000

24

24

MS21042L4

Nut

**

m122452 SP

12-10-26

Location

Loc Qty

Loc Code

ST300

4276

119075

125

121011

894

121444

2957

121652

300

SMB

May-28-12 8:07:23 AM

Shop Packet Print

Page 5

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
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NOTE: Date & initial all entries

Picklist Print

May-28-12 8:07:23 AM

Page 6

Work Order ID: 81522

Parent Item: D350-748-201

Parent Item Name: Crosstube Installation, High Aft

81522

D350-748-201

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

MS21042L5

Purchased

No

220

Each

1,473.000

4

4

MS21042L5

Nut

**

SP

Location

Loc Qty

Loc Code

300

500

121652

500

ST300

973

108827

8

116105

5

116548

43

117611

18

119109

891

17651

8

AX

SMB

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

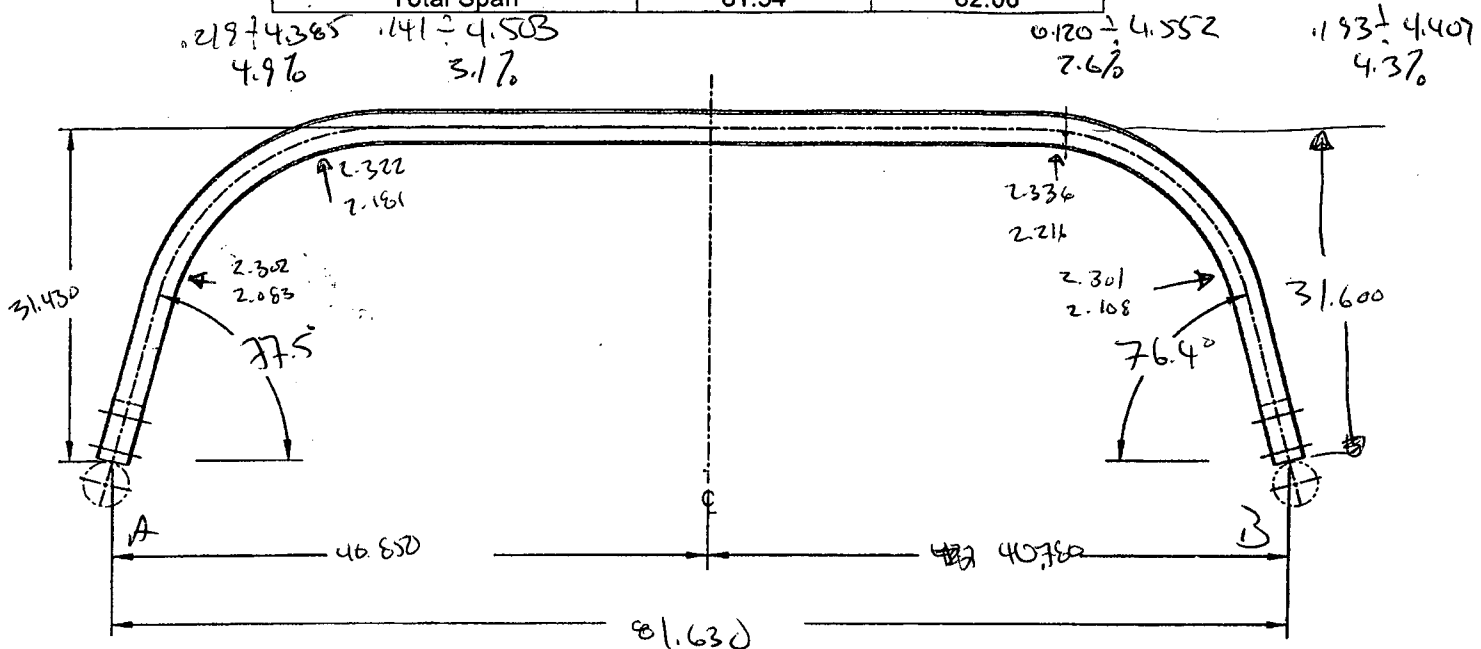
| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
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| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
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NOTE: Date & initial all entries

| | | | |
|---|----------------|--------------|--------------|
| DART AEROSPACE LTD | | Work Order: | 81522 |
| Description: Crosstube High Aft (AS350/355) | | Part Number: | D350-748-201 |
| Inspection Dwg: D350-748-241 | Rev: <i>EF</i> | Page 1 of 1 | |

Active stress Ref.

| Required Dimension | Min | Max |
|--------------------|-------|-------|
| Height | 31.22 | 31.48 |
| 1/2 Span | 40.77 | 41.03 |
| Angle | 75 | 77 |
| Total Span | 81.54 | 82.06 |



| Comments | |
|-----------------|-----------------------------------|
| twist = 0.295 | |
| Side A = | 3.17% @ top END of Bend |
| | 4.97% @ Bottom END of Bend (cuff) |
| Side B = | 2.67% @ top END of Bend |
| | 4.37% @ Bottom END of Bend (cuff) |
| QC15 Inspection | |
| Date | 17/10/09 |

Acceptable *(DAS 12)*
 12/10/14

| Rev | Date | Change | Revised by | Approved |
|-----|----------|-----------------|------------|--------------------|
| A | 07.02.06 | New Issue | KJ/JM | |
| B | 10.08.23 | Dwg Rev updated | KJ | <i>[Signature]</i> |

Dart Aerospace Ltd

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
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| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTE: Date & initial all entries

| Item | Qty -241 | Part Number | Description |
|------|-------------|---------------|--|
| 1 | X | D350-748-241 | CROSSTUBE ASSEMBLY (AS 350/355 HI AFT) |
| 2 | 1 | D6015-125 | CROSSTUBE (OR D6018-125) |
| 3 | 2 | D3502-1 | SUPPORT |
| 4 | 2 | D2856-400-710 | ABRASION STRIP |
| 5 | 1 | AELS-1032-225 | INSERT |
| 6 | 1 | NAS1149D0363J | WASHER (OR AN960JD10) |
| 7 | 2 | MS21920-20 | CLAMP (PER DART SPEC. M-MS21920-20) |
| 8 | 1 | MS27039-1-10 | SCREW |

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6015-125 OR D6018-125
FINISHED LENGTH = 122.700±0.06
- FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- IDENTIFICATION: DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- WEIGHT: 29.85 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT ALL EDGES FROM MACHINING
LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER
BENDING.
- BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO
VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE,
CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES,
NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.
CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE
MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO
CRACKING/CHIPPING/GROOVES.
- TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT
NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN
CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER

NO. 81522 MLJ
12/05/28

RELEASED
2011-01-08
MR

| | | | |
|------------|---|---|--------------|
| F | ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4) | CP | 10.11.23 |
| E | REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C8-3, D2-3) | RF | 09.09.30 |
| D | MAG. PARTICLE AND CAD PLATE AS MFD. | CP | 06.10.31 |
| C | ADD CAD PLATING | CP | 06.08.14 |
| B | ADD D6018-125 & PRIME AND PAINT | CP | 06.06.30 |
| A | NEW ISSUE | CP | 06.03.31 |
| REV. | DESCRIPTION | BY | DATE |
| DESIGN | q | DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA | |
| DRAWN | q | | |
| CHECKED | h | DRAWING NO. | REV. F |
| MFG. APPR. | E | D350-748-241 | SHEET 1 OF 4 |
| APPROVED | H | TITLE | SCALE |
| DE APPR. | H | CROSSTUBE (AS 350/355 HI AFT) | NTS |
| DATE | 10.11.23 | COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS UNDERSTANDING THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. | |

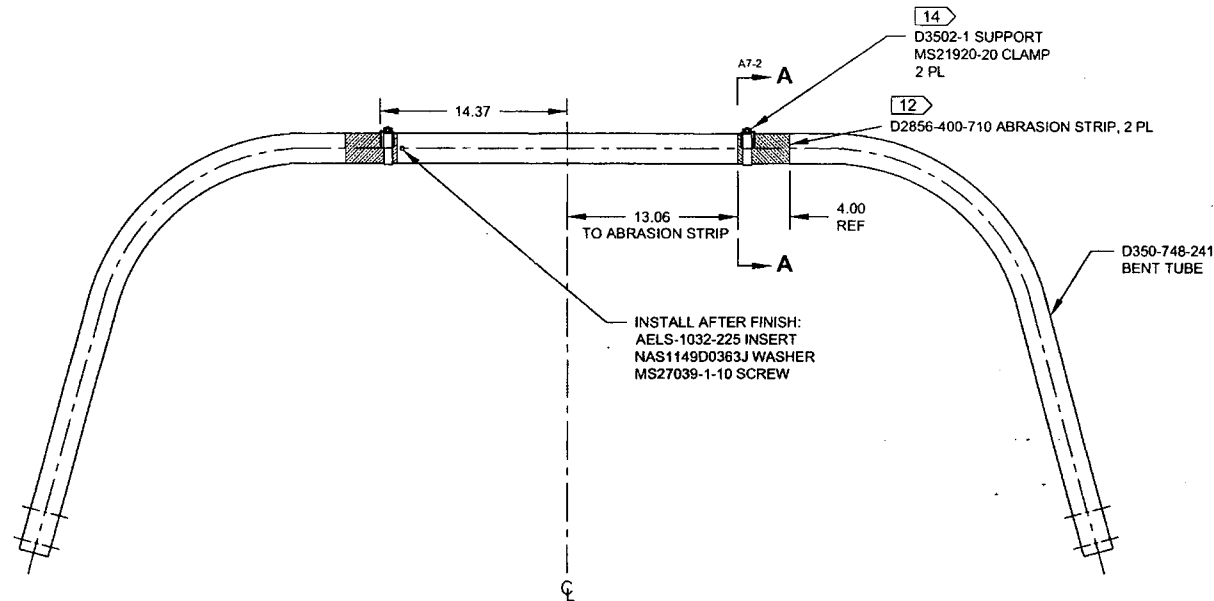
| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
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| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

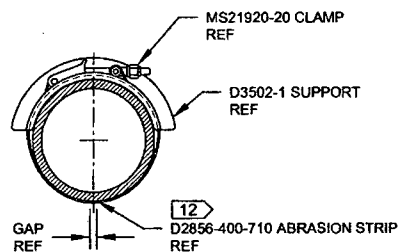
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
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| | | | | | | | | |
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NOTE: Date & initial all entries



**D350-748-241
ASSEMBLY DETAIL**



**SECTION A-A D4-2
SCALE 4X**

RELEASED
2011-05-19
JMT

| | | | |
|------------|----------|---|--------------|
| DESIGN | 92 | DART AEROSPACE LTD | |
| DRAWN | 92 | HAWKESBURY, ONTARIO, CANADA | |
| CHECKED | 13 | DRAWING NO. | REV. F |
| MFG. APPR. | 13 | D350-748-241 | SHEET 2 OF 4 |
| APPROVED | 14 | TITLE | SCALE |
| DE APPR. | 14 | CROSSTUBE (AS 350/355 HI AFT) | NTS |
| DATE | 10.11.23 | COPYRIGHT © 2006 BY DART AEROSPACE LTD <small>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small> | |

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

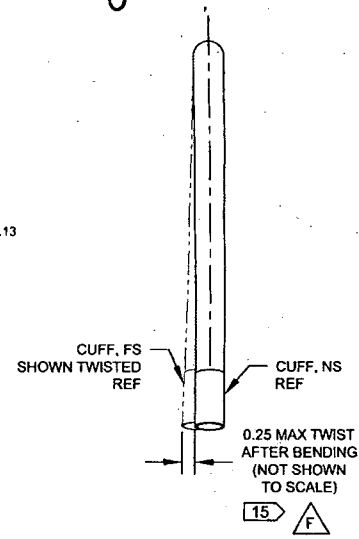
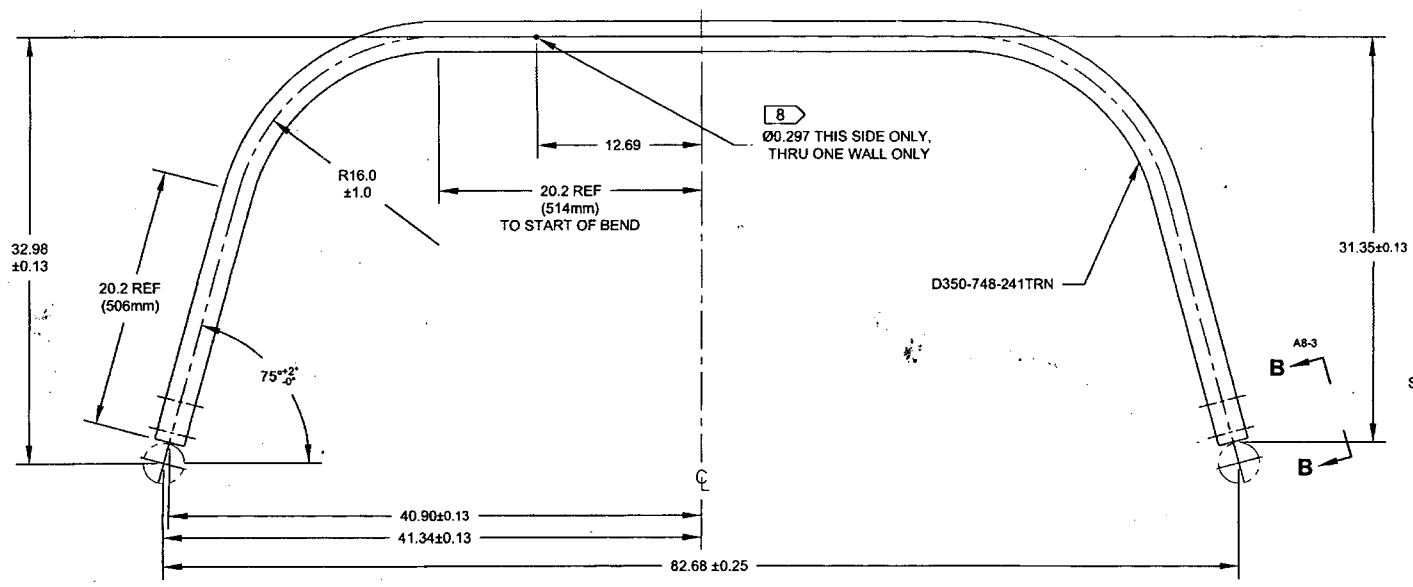
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
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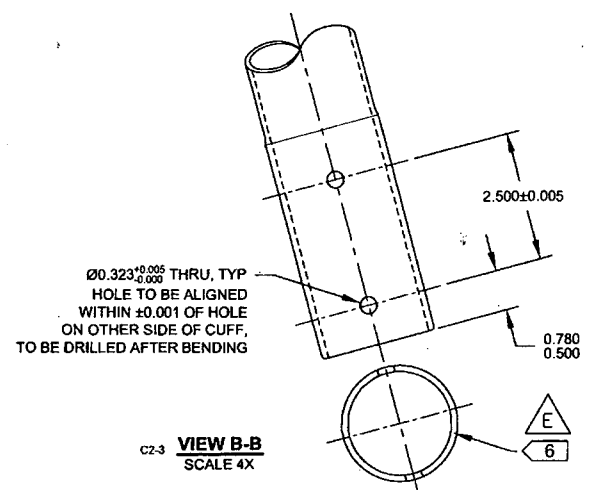
NOTE: Date & initial all entries

8 7 6 5 4 3 2 1

81522



D350-748-241
BENDING AND DRILLING DETAIL 10



VIEW B-B
SCALE 4X

RELEASED
2011-01-18

| | | | |
|------------|----------|--|--------------|
| DESIGN | 92 | DART AEROSPACE LTD | |
| DRAWN | 92 | HAWKESBURY, ONTARIO, CANADA | |
| CHECKED | 12 | DRAWING NO. | REV. F |
| MFG. APPR. | 12 | D350-748-241 | SHEET 3 OF 4 |
| APPROVED | 12 | TITLE | SCALE |
| DE APPR. | 12 | CROSSTUBE (AS 350/355 HI AFT) | NTS |
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8 7 6 5 4 3 2 1

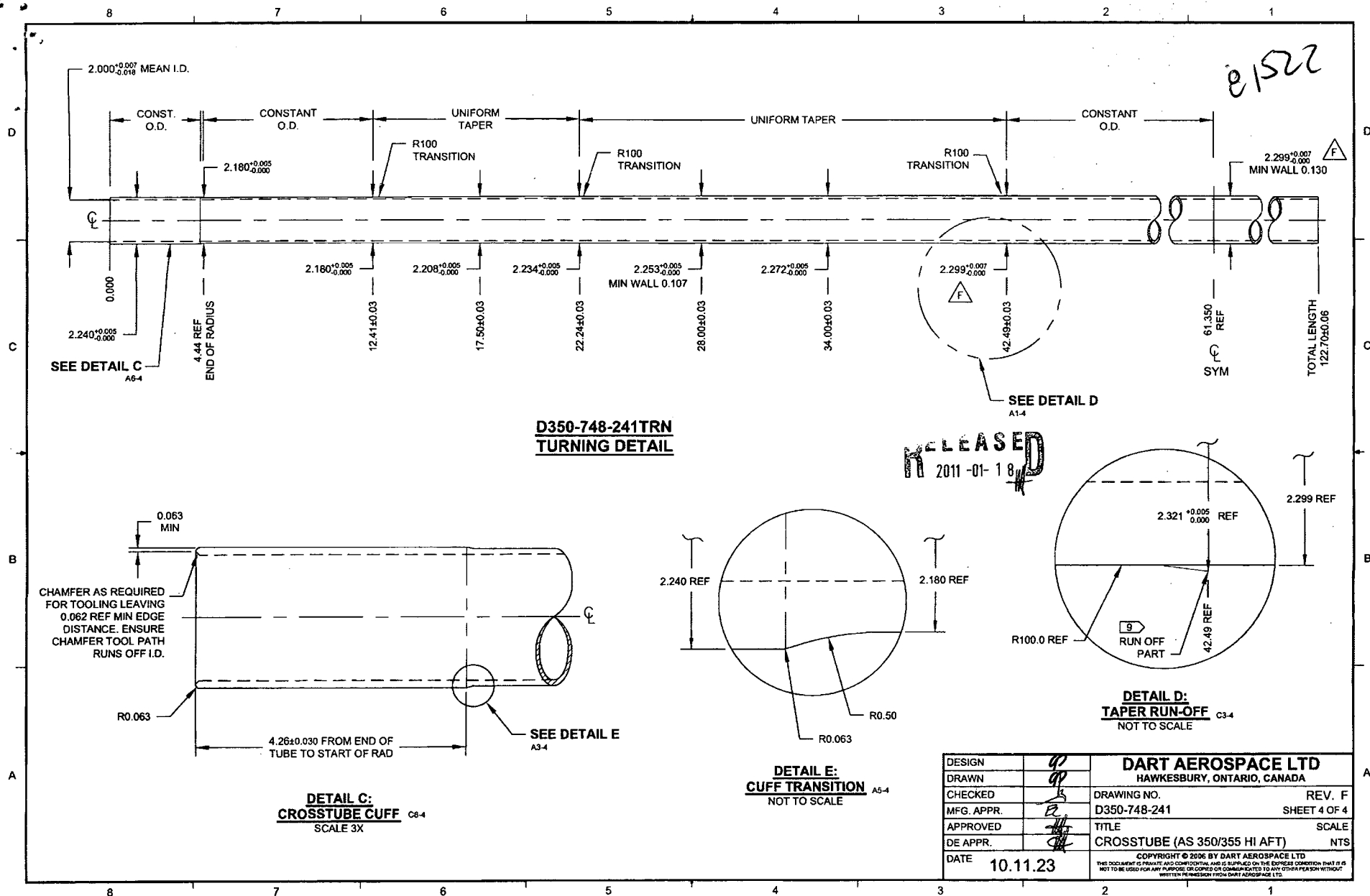
| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries



| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

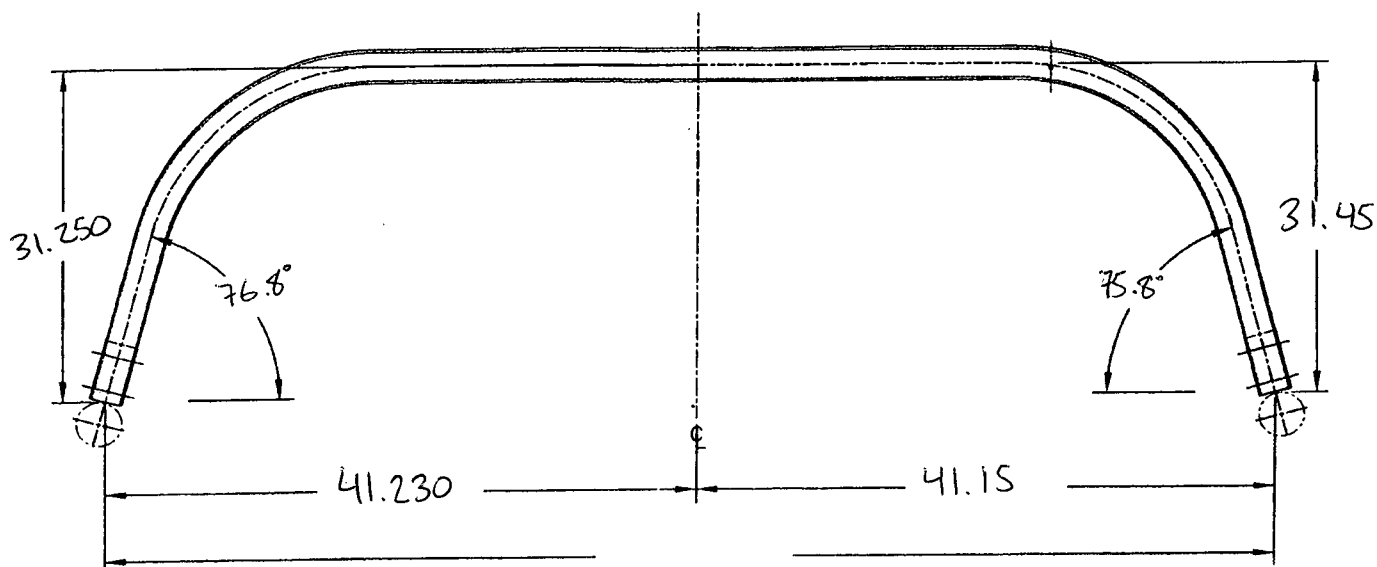
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NOTE: Date & initial all entries

| | | |
|--|---------------------|--------------------|
| DART AEROSPACE LTD | Work Order: | 81522 |
| Description: Crosstube High Aft (AS350/355) | Part Number: | D350-748-201 |
| Inspection Dwg: D350-748-241 Rev: F | | Page 1 of 1 |

| Required Dimension | Min | Max |
|--------------------|-------|-------|
| Height | 31.22 | 31.48 |
| 1/2 Span | 40.77 | 41.03 |
| Angle | 75 | 77 |
| Total Span | 81.54 | 82.06 |
| Bending Passes | 7 | -- |
| Crushing | -- | 6% |
| Twist | -- | 0.25 |



| | Side A | Side B |
|-------------------------------|--------|--------|
| Bending Passes | | |
| Crushing | | |
| Comments | | |
| TWIST - 0.292 RM 12-10-1 | | |
| | | |
| | | |

TW
12-10-1

| | |
|-----------------|--|
| QC15 Inspection | |
| Date | |

| Rev | Date | Change | Revised by | Approved |
|-----|----------|--|------------|----------|
| A | 07.02.06 | New Issue | KJ/JM | |
| B | 10.08.23 | Dwg Rev updated | KJ | |
| C | 12.04.16 | Added bending, crushing & twist dimensions | KJ | |
| D | 12.07.31 | Dwg Rev updated | KJ | |

**METCOR INC.**560 BOUL. ARTHUR-SAUVE
ST-EUSTACHE, QC, J7R 5A8
Tel: 450-473-1884 / Fax: 450-491-5498**Certificat de Conformité**

Certificate of Compliance

| BON DE TRAVAIL order | CHARGEMENT load |
|-------------------------|--------------------|
| 179761 | 1 |

CLIENT / customer 215DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

1

| COMMANDE DU CLIENT customer po | BON DE LIVRAISON DU CLIENT customer shipper no. | MATÉRIEL material | CODE DE TRAITEMENT mat'l heat code | NUMÉRO DE LOT lot number |
|-----------------------------------|--|----------------------|---------------------------------------|-----------------------------|
| PO18026 | | Steel | | |

SPÉCIFICATIONS DU PROCÉDÉ
processing specifications

STRESS REL

SAE AMS 2759/1 REV.E

EXIGENCE / requirement **SPÉCIFICATIONS / specified** **TESTS EXÉCUTÉS / performed** **RÉSULTATS DE TESTS / results**

Visual

| QUANTITÉ quantity | POIDS weight | DESCRIPTION DES PIÈCES parts description |
|----------------------|-----------------|--|
| 5 | 150 | D350-748-101 (1) CROSSTUBE REFERENCE 87331 (1) D350-748-101 CROSSTUBE REFERENCE: 87335 (1) D350-748-101 CROSSTUBE REF: 87339 (1) D350-748-201 CROSSTUBE REFERENCE: 87220 (1) D350-748-201 CROSSTUBE REFERENCE: 81522 CONTENANT: 1 NIL |

COMMENTAIRES / comments

ALL THE HEAT TREATMENT PROCESSING PERFORMED ON THIS ORDER WAS ACCOMPLISHED USING HEAT TREATMENT EQUIPEMENT THAT MEETS THE REQUIREMENTS OF AMS 2759. ALL THE HEAT TREATMENT OPERATIONS WERE ACCOMPLISHED IN ACCORDANCE WITH THE REQUESTED/REQUIRED HEAT TREATMENT SPECIFICATION AND ALL REQUIRED VERIFICATIONS TEST HAVE BEEN PERFORMED AND DOCUMENTED. NO



METCOR INC.

560 BOUL. ARTHUR-SAUVÉ
ST-EUSTACHE, QC, J7R 5A8
Tel: 450-473-1884 / Fax: 450-491-5498

Certificat de Conformité

Certificate of Compliance

| BON DE TRAVAIL order | CHARGEMENT load |
|-------------------------|--------------------|
| 179761 | 1 |

CLIENT / customer 215

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

1

UNAUTHORIZED CHANGES OR DEVIATIONS TO REQUIRED HEAT TREATMENT SPECIFICATIONS OR
PROCEDURES HAVE BEEN PERFORMED.

CERTIFIÉ par / Certified by:

Isabel Olor

DATE: 2012-10-03



Packing Slip



Cadorath Coating

2150 Logan Avenue, Winnipeg, Manitoba R2R-0J2

Phone: (204) 633-9420 Fax: (204) 633-8033

INVOICE NUMBER:

S 62946

Sold To:

Dart Aerospace Ltd.

1270 Aberdeen St.

Hawksbury, ON K6A 1K7

ShipTo:

Net 2% Interest Per Month charged on Overdue Accounts.

Any claims for shortages, overcharges, or damaged goods must be made within seven (7) days from receipt of goods.

| Customer Order #: | Date Received: | Terms: | G.S.T. #: | Ship Via: | Ship Date: |
|-------------------|----------------|-------------|-------------------|-----------|-------------|
| PO18101 | Oct-15-2012 | NET 30 DAYS | 10071 6547 RT0001 | | Oct-23-2012 |

Item # Qty P/N & Description

| | | | |
|---|------|------------------|------------|
| 1 | 1 EA | CROSSTUBE | S/N 87339 |
| | | P/N d350-748-101 | W/O 118419 |
| 2 | 1 EA | CROSSTUBE | S/N 87331 |
| | | P/N d350-748-101 | W/O 118420 |
| 3 | 1 EA | CROSSTUBE | S/N 87335 |
| | | P/N d350-748-101 | W/O 118421 |
| 4 | 1 EA | CROSSTUBE | S/N 81522 |
| | | P/N D350-748-201 | W/O 118422 |

**CERTIFICATE OF
CONFORMANCE****CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1****DATE:** Oct-23-2012**CONSIGNED TO:** Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7**W/O #:** 118422**INVOICE #:** 62946**CONTRACT OR
PURCHASE ORDER # PO18101****DESCRIPTION:** CROSSTUBE**QTY** 1**P/N #** D350-748-201**S/N #** 81522**CADMIUM PLATE IAW AMS-QQ-P-416C TYPE 2 YELLOW CLASS 1.
MPI IAW ASTM-E-1444. BAKE HEAT CHART # 12-1082, 12-1097.****CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.****Approved Inspector:** _____



LIQUID PENETRANT TEST REPORT

P- 10177

PAGE 1 OF 1

CLIENT Dart Aerospace DATE Oct 25 2012 TIME AM ☒ PM ☐
ATTENTION Chantale, Linda, Andy ACUREN JOB NO. 188-12-C0508
ADDRESS 1270 Aberdeen St PO/VO No. _____
Hawkesbury, on WORK LOCATION As address
ACCEPTANCE STD. ASTM 1417 / ast 020 REV./DATE 2005
PROJECT PT- Wet Fluorescent Liquid Penetrant Inspection
ITEM(S) EXAMINED - See Below

JOB DESCRIPTION PROCEDURE NO. LT-002 REV./DATE 2009 TECHNIQUE NO. LT-002 REV./DATE 2009

PART NO. _____ MATERIAL Aluminium 1815 THICKNESS _____
SCOPE Performed a wet Fluor. L.P.I on 100% of the external surface on items mentioned below

TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☐ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND Magnaflux BLACK LIGHT S/N 13790 OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT ZL-6T MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER MINIMUM DRY TIME > 10 MIN. OTHER _____
DEVELOPER SKD-S2 MINIMUM DWELL TIME 30 MIN. LIGHT METER S/N 1098866 CAL DUE DATE Oct 28 2012
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < - 4°C/ 20°F ☐ - 4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

| | | | | |
|---|----------------|------------|---|--------------------------|
| 1 | Cross tube | WOID 86955 | ✓ | ITEM ID 0212-664-107 Fwd |
| 2 | Cross tube | WOID 86956 | ✓ | ITEM ID 0212-664-107 Fwd |
| 3 | Cross tube | WOID 89390 | ✓ | ITEM ID 0212-664-107 Fwd |
| 4 | Cross tube | WOID 89391 | ✓ | ITEM ID 0212-664-107 Fwd |
| 5 | Tube APT | WOID 92051 | ✓ | ITEM ID 04139-3 |
| 6 | Tube Fwd | WOID 92052 | ✓ | ITEM ID 04139-1 |
| 7 | Cross tube Ins | WOID 81522 | ✓ | ITEM ID 0350-748-201 APT |

No relevant indication was detected to per applicable standard at the time of inspection.

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

| | |
|---|--|
| CLIENT REPRESENTATIVE <u>Andy Sheldon</u> PRINT <u>ASheldon</u> SIGNATURE | DTR # <u>E-120376</u> |
| TECHNICIAN (SIGNATURE): <u>Alexandre Michard</u> | REPORT REVIEWED BY: |
| NAME (PRINT): <u>Alexandre Michard</u> | NAME INITIALS |
| CGSB LEVEL <u>II</u> SNT LEVEL <u>II</u> CGSB REG. NO. <u>10148</u> | CGSB LEVEL _____ SNT LEVEL _____ CGSB REG. NO. _____ |

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CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

smf

5.0 PARTS LIST

| Qty -101 | Qty 201 | Part Number | Description |
|-------------|---------------|-------------------------|--|
| X | | D350-748-101 | CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD |
| | X | D350-748-201 | CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT |
| 1 | | D350-748-141 | CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD |
| | 1 | D350-748-241 | CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT |
| *2 | *2 | D3502-1 | SUPPORT |
| *2 | *2 | D2856-400-710 | ABRASION STRIP |
| *1 | *1 | AELS-1032-225 | INSERT |
| *2 | *2 | MS21920-20 | CLAMP |
| *1 | *1 | MS27039-1-10 | SCREW |
| *1 | *1 | AN960JD10 | WASHER |
| 4 | 4 | D3500-1 | SADDLE |
| 16 | 16 | D3501-1 | BUSHING |
| 16 | 16 | AN4-6A | BOLT |
| 8 | 8 | AN4-41A | BOLT |
| 4 | 4 | AN5-32A | BOLT |
| 32 | 32 | AN960JD416 | WASHER |
| 8 | 8 | AN960JD516 | WASHER |
| 24 | 24 | MS21042L4 | NUT (OR MS21042-4) |
| 4 | 4 | MS21042L5 | NUT (OR MS21042-5) |

* REFERENCE ONLY. PARTS ARE INCLUDED IN D350-748-141/241 ASSEMBLIES ABOVE

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Revision: B

Date: 07.06.15